Trend Study 10-17-00

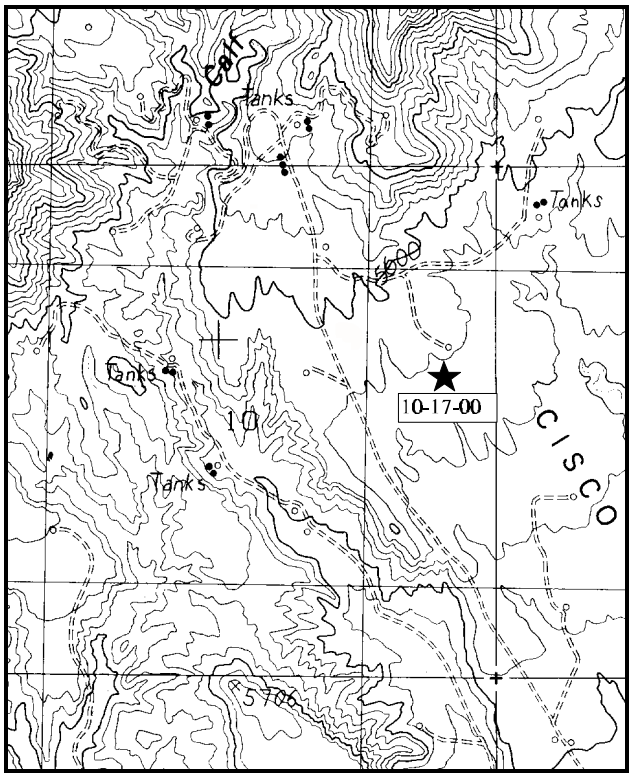
Study site name: East Calf Canyon . Range type: Big Sagebrush .

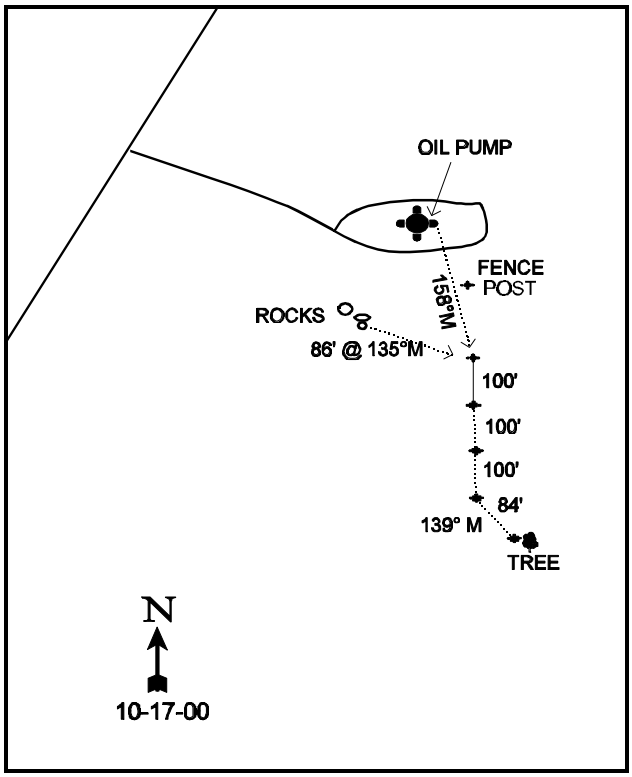
Compass bearing: frequency baseline 165°M .

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the main gate at Cunningham Ranch go southeast on the main road for 1.55 miles to a fork and turn left (northeast). Proceed 0.4 miles to a fork. Turn right and proceed 0.85 to a fork. Stay left and go 1.05 miles to another fork. Turn right and go 0.2 miles to a well numbered Cisco Federal #1. The first baseline stake is approximately 100 feet southeast of the road in the sagebrush opening.





Map Name: Calf Canyon Diagrammatic Sketch

Township 20S , Range 21E , Section 10 UTM. 4326704.855 N, 623276.606 E

DISCUSSION

Trend Study No. 10-17 (16B-4)

The East Calf Canyon transect is located in a sagebrush clearing on a mixed pinyon-juniper-sagebrush bench at the base of the Book Cliffs. The study is located north of Horse Pasture and Nash Wash at an elevation of 5,500 feet with a slight southeastern exposure. This Wyoming big sagebrush type has been an important wintering area for several hundred deer. This site is located within the large Cisco Allotment which is grazed from November 1 to May 10 by 3 cattle permittees. Two sheep premittees also use the allotment from December through early May. Prior to 1986, sheep use occurred in the winter months and cattle were present from mid-October to mid-June. A 330-acre chaining project was completed in the fall of 1987 on the area just east and northeast of the study site. The chaining and seeding was an Interagency project coordinated with State Lands, BLM, and DWR. This chaining was done with a light smooth chain to help protect an understory population of decadent cliffrose. Pellet group transect data from 2000 indicates deer use to be moderate with an estimated 29 deer days use/acre (72 ddu/ha). No elk pellets or cattle pats were sampled in the area of the transect. Besides its importance as big game and livestock winter range, there is active oil and gas exploration with associated developments and network of roads. At the north end of the clearing is an oil pump and storage tanks.

Soil on the site is a moderately deep, well-drained, loam to clay loam with an average temperature of 62°F at over 13 inches in depth. Effective rooting depth is estimated at nearly 16 inches. No hardpan, rock, or gravel exists in the profile, thus the profile stoniness index is more a reflection of increased compaction. Soils are neutral in reactivity (pH of 7.2). Phosphorus and potassium are lower than the 10 ppm and 70 ppm thought necessary for normal plant development. Shrub interspaces are mostly bare with small gullies and compacted animal trails showing the effects of some surface erosion. It was estimated in 2000 that the interspaces have between 4-6 inches of soil loss as indicated by the pedestaled shrubs. Litter is built up only under the sagebrush and had an estimated cover value of 39% in 1995, decreasing to 34% in 2000. Bare ground cover increased from 29% in 1995 to 47% in 2000.

The overall area supports a complex comprised mostly of juniper-pinyon woodland with scattered sagebrush openings. These sagebrush-grass openings provide the majority of the forage for deer, sheep, and cattle. Wyoming big sagebrush is the key browse species, and according to earlier BLM studies on the allotment in 1986, sagebrush utilization was heavy to severe. Sagebrush density was estimated at 3,999 plants/acre in 1986, increasing to 5,600 plants/acre in 1995, and 5,880 plants/acre in 2000. Data collected by the range crew in late June 1986 found a high percentage of decadent plants (55%) and many plants in the heavily hedged form class (57%). In 1995, percent decadency dropped to 18% and hedging was mostly moderate with very few heavily hedged plants. In 2000, percent decadency slightly increased to 25%, with 22% of the population displaying heavy use. Currently (‘00), thirty-two percent of the decadent plants are classified as dying. However, young recruitment is high at 24%, and adequate to replace any individuals lost to die-off. The past heavily hedged appearance of the plants is also not as apparent. It now appears, with the apparent reduction in intensity of grazing, the sagebrush are responding positively. Seedlings, although not as numerous as in the past, can be found clustered around isolated productive individuals. Leader growth averaged about 4 inches in 2000 with few seed stalks on mature plants. Vegetative cover from Wyoming big sagebrush is estimated at 17-19%, and with this level of cover, the herbaceous understory is in a suppressed state and will continue to have a difficult time increasing without a decrease in sagebrush density in the future.

The two other browse species found on the transect are broom snakeweed and pricklypear cactus. The broom snakeweed population appeared to be slightly increasing and shifting to a more mature age structure in 1995. However, like other sites on the south end of the Book Cliffs, the density of snakeweed decreased in 2000 due to drought. Utah Juniper surrounds the sagebrush opening and does not appear to be invading. Mature trees,

especially on the edges and in the opening, have been highlined. Point-center quarter data from 2000 estimate 22 juniper trees/acre.

The sagebrush interspaces are basically devoid of vegetation except for annual cheatgrass. Even this invader species grows best under the protection of the sagebrush canopy. Forty-three percent of the total vegetative cover came from cheatgrass in 1995, making it present in nearly every quadrat (98%). However, due to drought in 2000, cheatgrass greatly decreased in abundance and was sampled in only 33% of the quadrats, while only making up only 5% of the total vegetative cover. Bottlebrush squirreltail significantly increased in sum of nested frequency between 1986 and 1995, but significantly decreased in 2000. It occurs sporadically throughout the site, but mostly under shrub crowns. There are a few scattered forbs, the most abundant being longleaf phlox and several *Astragalus* species that occur in low densities. The disturbed areas along the road and drill pad are a refuge for exotic annual weeds such as Russian thistle, but they have not yet invaded into the flat. Sum of nested frequency for all perennial herbaceous species decreased in 2000.

1986 APPARENT TREND ASSESSMENT

As long as current browsing pressure continues, especially by livestock, the long-term vegetative trend appears to be going down. The sagebrush cannot sustain current levels of use for many more years and there does not appear to be enough young plants to maintain stand density. A drought or severe winter could be deleterious. Soil trend appears downward because of the lack of ground cover, subsequent loss of the sandy soil through gully and surface erosion and lack of establishment of perennial plants in the bare areas. A combination of reduced grazing pressure and a sagebrush reduction treatment would be helpful in rejuvenating this area.

1995 TREND ASSESSMENT

Due to the recovery of the Wyoming sagebrush population from many years of excessive grazing, the browse trend is slightly upward. Although the Wyoming big sagebrush appears to be adequately recovering from heavy grazing pressure, the density of sagebrush coupled with the extended drought is causing the herbaceous understory to be stunted and to have poor diversity. The broom snakeweed population appears to be slightly increasing and the age class structure indicates a mature population with many young and seedlings present. This slight increase could be due to the much larger sample size and better distribution of the sample used throughout the sagebrush opening. The herbaceous understory is in poor condition with very few perennial species present. Sum of nested frequency for bottlebrush squirreltail and longleaf phlox significantly increased since 1986, but do not provide much forage or cover on this site. Therefore, the herbaceous understory trend is stable but with poor composition. The interspaces have little protection from erosion and some pedestaling is evident, but it does not appear to be any different than in 1986. Most litter and herbaceous vegetation is associated with the sagebrush plants, leaving the interspaces bare of cover. Trend for soil is stable for now. Thinning the sagebrush population on this site would benefit the herbaceous understory as well as provide needed soil protection.

TREND ASSESSMENT
soil - stable, but poor condition (3)
browse - slightly upward, although the Wyoming big sagebrush cover is dense and detrimental to the herbaceous understory establishment (4)
herbaceous understory - stable, but poor composition (3)

2000 TREND ASSESSMENT

Trend for soil is slightly down to a large increase in bare soil, decreases in vegetation and litter cover, and a decrease in sum of nested frequency for perennial herbaceous species. The ratio of protective ground cover to

bare soil also largely decreased due to the these factors. Trend for browse is stable. Wyoming big sagebrush slightly increased in percent decadency and heavy use in 2000, but is still well below the 1986 levels of 55% and 57% respectively. Recruitment from young plants is currently high at 24% and adequate to replace the decadent, dying individuals that may be lost to die-off. The sagebrush is very dense at this site, and some thinning out of the population would be positive. Trend for the herbaceous understory is slightly down and in poor condition. Sum of nested frequency of the herbaceous perennial component decreased in 2000 from an already low level. The herbaceous understory will remain in this suppressed condition and poor composition unless the sagebrush is thinned out.

TREND ASSESSMENT
soil - slightly down (2)
browse - stable (3)
herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Herd unit 10 , Study no: 17

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Bromus tectorum (a)	-	b359	a95	-	98	33	16.90	1.02
G	Hilaria jamesii	3	-	-	1	-	-	-	-
G	Poa fendleriana	-	3	1	-	1	1	.00	.00
G	Sitanion hystrix	a31	b95	a58	14	40	26	.66	.41
G	Vulpia octoflora (a)	-	b37	a1	-	14	1	.07	.00
Total for Annual Grasses		0	396	96	0	112	34	16.97	1.02
Total for Perennial Grasses		34	98	59	15	41	27	0.66	0.41
Total for Grasses		34	494	155	15	153	61	17.63	1.44
F	Astragalus convallarius	a-	a-	b6	-	-	3	.00	.19
F	Astragalus spp.	1	8	1	1	4	1	.36	.00
F	Castilleja linariaefolia	-	6	3	-	2	1	.06	.03
F	Calochortus nuttallii	2	-	-	2	-	-	-	-
F	Chenopodium leptophyllum (a)	-	3	-	-	1	-	.00	-
F	Descurainia spp. (a)	-	8	-	-	3	-	.01	-
F	Draba spp. (a)	-	b18	a2	-	7	1	.03	.00
F	Eriogonum spp.	-	2	-	-	1	-	.00	-
F	Erigeron pumilus	-	-	1	-	-	1	-	.00
F	Erigeron utahensis	ab1	b8	a-	1	5	-	.06	-
F	Gilia hutchinifolia (a)	-	b17	a-	-	8	-	.04	-
F	Lappula occidentalis (a)	-	b8	a-	-	4	-	.02	-
F	Phlox longifolia	39	60	41	16	25	21	.17	.13
F	Plantago patagonica (a)	-	b18	a-	-	7	-	.03	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
F	Salsola iberica (a)	-	$_{a}$-	$_{b}$29	-	-	12	-	.06
F	Schoencrambe linifolia	-	4	6	-	2	3	.01	.04
Total for Annual Forbs		0	72	31	0	30	13	0.15	0.06
Total for Perennial Forbs		43	88	58	20	39	30	0.67	0.40
Total for Forbs		43	160	89	20	69	43	0.82	0.46

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 17

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia nova	-	-	-	.15
B	Artemisia tridentata wyomingensis	91	97	17.57	19.38
B	Atriplex canescens	-	-	-	.38
B	Gutierrezia sarothrae	60	23	1.05	.21
B	Juniperus osteosperma	0	2	1.85	.03
B	Opuntia spp.	5	9	.30	.18
Total for Browse		156	131	20.77	20.33

CANOPY COVER --
Herd unit 10 , Study no: 17

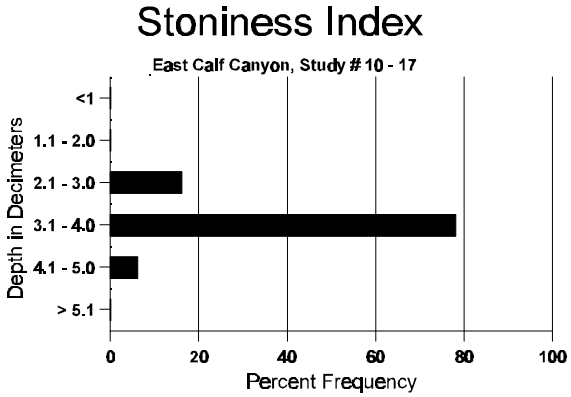
Species	Percent Cover '00
Juniperus osteosperma	3

BASIC COVER --
Herd unit 10 , Study no: 17

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	374	218	5.50	37.69	23.30
Rock	57	8	.25	.27	.69
Pavement	53	90	.25	.17	.43
Litter	389	362	47.00	38.50	33.78
Cryptogams	190	211	2.50	7.52	9.76
Bare Ground	284	333	44.50	29.38	47.86

SOIL ANALYSIS DATA --
Herd Unit 10, Study # 17, Study Name: East Calf Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
15.70	62.0 (13.62)	7.2	44.0	29.4	26.6	0.8	6.6	67.2	0.5



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 17

Type	Quadrat Frequency	
	'95	'00
Sheep	9	-
Rabbit	16	19
Deer	21	30

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
00	00
-	-
35	N/A
374	29 (72)

BROWSE CHARACTERISTICS --
Herd unit 10 , Study no: 17

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	86	19	-	-	-	-	-	-	-	-	19	-	-	-	1266			19
	95	35	-	-	-	-	-	-	-	-	35	-	-	-	700			35
	00	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
Y	86	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	95	54	3	-	-	-	-	-	-	-	57	-	-	-	1140			57
	00	54	10	-	3	2	-	2	-	-	71	-	-	-	1420			71
M	86	5	1	14	-	-	-	-	-	-	18	-	2	-	1333	12	18	20
	95	4	163	7	-	-	-	-	-	-	174	-	-	-	3480	20	33	174
	00	35	42	32	9	23	9	-	-	-	147	-	3	-	3000	18	30	150
D	86	13	-	20	-	-	-	-	-	-	29	-	4	-	2200			33
	95	5	41	3	-	-	-	-	-	-	38	-	-	11	980			49
	00	2	28	16	9	8	9	1	-	-	50	-	-	23	1460			73
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	300			15
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	440			22

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	02%	57%	10%	+29%
'95	74%	04%	04%	+ 5%
'00	38%	22%	09%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	3999	Dec:	55%
	'95	5600		18%
	'00	5880		25%

Gutierrezia sarothrae																		
S	86	8	-	-	-	-	-	-	-	-	8	-	-	-	533			8
	95	27	-	-	-	-	-	-	-	-	27	-	-	-	540			27
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	95	99	-	-	-	-	-	-	-	-	99	-	-	-	1980			99
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	19	-	-	-	-	-	-	-	-	19	-	-	-	1266	9	7	19
	95	139	2	-	7	-	-	-	-	-	148	-	-	-	2960	9	9	148
	00	45	-	-	-	-	-	-	-	-	45	-	-	-	900	5	6	45
D	86	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	4	-	-	-	-	-	-	-	-	2	-	-	2	80			4
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+61%
'95	.80%	00%	00%	-80%
'00	00%	00%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	1932	Dec:	14%
	'95	4940		0%
	'00	1000		8%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'95	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'95	0		-
	'00	40		-

Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	5	-	-	-	-	-	-	-	-	5	-	-	-	100	6	19	5
	00	12	-	-	-	-	-	-	-	-	12	-	-	-	240	4	19	12

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'95	00%	00%	00%
'00	00%	00%	00%

%Change

+58%

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'95	100		-
	'00	240		-